

In the Claims

Claim 1 (Original): A multi-functional contrast agent comprising a CdS:Mn/ZnS core/shell quantum dot, wherein said quantum dot is fluorescent, radio-opaque, and paramagnetic.

Claim 2 (Original): The contrast agent of claim 1, wherein said contrast agent further comprises a targeting moiety conjugated to said quantum dot.

Claim 3 (Cancelled)

Claim 4 (Currently amended): The contrast agent of ~~any of claims 1 to 3~~ claim 1, wherein said contrast agent further comprises a targeting moiety conjugated to said quantum dot, wherein said targeting moiety comprises a TAT peptide or folic acid.

Claim 5 (Currently amended): The contrast agent of ~~any of claims 1 to 4~~ claim 1, wherein said contrast agent further comprises a coating (outer shell) surrounding said ZnS shell.

Claim 6 (Currently amended): The contrast agent of ~~any of claims 1 to 5~~ claim 1, wherein said contrast agent further comprises a coating (outer shell) and a targeting moiety conjugated to said coating.

Claim 7 (Currently amended): The contrast agent of ~~any of claims 1 to 6~~ claim 1, wherein said ZnS shell of said contrast agent is amine functionalized.

Claim 8 (Currently amended): The contrast agent of ~~any of claims 1 to 7~~ claim 1, wherein said contrast agent further comprises an amine functionalized silica coating around said ZnS shell.

Claim 9 (Currently amended): The contrast agent of ~~any of claims 1 to 8~~ claim 1, wherein said quantum dot is water-dispersable.

Claim 10 (Currently amended): The contrast agent of ~~any of claims 1 to 9~~ claim 1, wherein said CdS:Mn/ZnS core/shell quantum dot further comprises a Gd (III)/SiO<sub>2</sub> coating (outer shell) or a Dys/SiO<sub>2</sub> coating (outer shell).

Claim 11 (Currently amended): The contrast agent of ~~any of claims 1 to 10~~ claim 1, wherein said quantum dot is doped with a fluorescent dye molecule or a paramagnetic material, or both.

Claim 12 (Currently amended): The contrast agent of ~~any of claims 1 to 10~~ claim 1, wherein said quantum dot further comprises a coating that renders said contrast agent activatable in a cell.

Claim 13 (Cancelled)

Claim 14 (Currently amended): The contrast agent of ~~any of claims 1 to 10~~ claim 1, wherein said quantum dot further comprises a coating that renders said contrast agent activatable in a cell, and wherein said coating is a carbohydrate selected from the group consisting of galactose, glycogen, or glucose.

Claim 15 (Original): The contrast agent of claim 10, wherein said quantum dot further comprises a Gd (III)/SiO<sub>2</sub> coating (outer shell), and wherein said quantum dot further comprises a carbohydrate that blocks the ninth coordination site of Gd in the absence of a carbohydrate-degrading enzyme.

Claims 16-17 (Cancelled)

Claim 18 (Currently amended): A method for visualizing a target within an opaque medium ~~using a multi-functional contrast agent of any of claims 1 to 16~~, wherein said method comprising introducing ~~the~~ a multi-functional contrast agent into the target or into the opaque medium and visualizing the target, wherein the contrast agent comprises a CdS:Mn/ZnS

core/shell quantum dot, wherein said quantum dot is fluorescent, radio-opaque, and paramagnetic.

Claim 19 (Original): The method of claim 18, wherein said opaque medium comprises living or dead biological tissue and said visualizing is carried out *in vitro* or *in vivo*.

Claim 20 (Original): The method of claim 18, wherein said target comprises a living or dead cell and said visualizing is carried out *in vitro* or *in vivo*.

Claim 21 (Currently amended): The method of ~~any of claims 18 to 20~~ claim 18, wherein said target comprises a vascular cell or vascular tissue *in vitro* or *in vivo*.

Claim 22 (Cancelled)

Claim 23 (Currently amended): The method of ~~any of claims 18 to 20~~ claim 18, wherein said target comprises a neural cell or neural tissue *in vitro* or *in vivo*.

Claim 24 (Cancelled)

Claim 25 (Currently amended): The method of ~~any of claims 18 to 20~~ claim 18, wherein said target comprises a cancer cell or cancer tissue *in vitro* or *in vivo*.

Claims 26-28 (Cancelled)

Claim 29 (Currently amended): The method of ~~claim 28~~ claim 18, wherein said contrast agent further comprises a targeting moiety ~~comprises comprising~~ a TAT peptide or folic acid.

Claim 30 (Currently amended): The method of ~~any of claims 18 to 29~~ claim 18, wherein said quantum dot further comprises Gd (III)/SiO<sub>2</sub> coating (outer shell) and a carbohydrate, wherein the carbohydrate blocks the ninth coordination site of Gd in the absence of a carbohydrate-degrading enzyme but renders the coordination site accessible to intracellular water in the presence of the carbohydrate-degrading enzyme.

Claim 31 (Currently amended): The method of claim 30, wherein the carbohydrate is selected from the group consisting of galactose, glycogen, ~~or~~ and glucose.

Claim 32 (Original): The method of claim 18, wherein the opaque medium comprises brain cells or brain tissue *in vivo*, wherein said introducing comprising administering the contrast agent to a human or non-human subject intravenously or intravascularly.

Claim 33 (Currently amended): The method of ~~any of claims 18 to 32~~ claim 18, wherein said visualizing is done grossly with the naked eye or using microscopy.

Claim 34 (Currently amended): The method of ~~any of claims 18 to 33~~ claim 18, wherein said visualizing is carried out by one or more modalities selected from the group consisting of fluorescence imaging, magnetic resonance imaging (MRI), and computer-aided tomography (CAT).

Claim 35 (Currently amended): The method of ~~any of claims 18 to 34~~ claim 18, wherein said visualizing is carried out by two or more modalities selected from the group consisting of fluorescence imaging, magnetic resonance imaging (MRI), and computer-aided tomography (CAT), and wherein said visualizing is carried out simultaneously or consecutively.

Claim 36 (Original): The method of claim 18, wherein the target comprises a stem cell or progenitor cell *in vitro* or *in vivo*.

Claim 37 (Cancelled)

Claim 38 (Original): The method of claim 18, wherein the quantum dot further comprises a Dys/SiO<sub>2</sub> Dys/SiO<sub>2</sub> coating (outer shell), and wherein said visualizing comprises carrying out magnetic resonance imaging (MRI).

Claim 39 (Original): The method of claim 18, wherein the quantum dot further comprises a Dys/SiO<sub>2</sub> Dys/SiO<sub>2</sub> coating (outer shell), and wherein said visualizing comprises carrying out magnetic resonance imaging (MRI) using a magnetic field above 4 Tesla.

Claim 40 (Cancelled)

Claim 41 (Currently amended): A mammal cell containing a multi-functional contrast agent of any of claims 1 to 17 comprising a CdS:Mn/ZnS core/shell quantum dot, wherein said quantum dot is fluorescent, radio-opaque, and paramagnetic.

Claims 42-50 (Cancelled)

Claim 51 (New): The multi-functional contrast agent of claim 1, wherein said contrast agent is associated with at least a portion of an implantable or deployable medical device.

Claim 52 (New): A composition comprising a multi-functional contrast agent and a pharmaceutically acceptable carrier, wherein said contrast agent comprises a CdS:Mn/ZnS core/shell quantum dot, wherein said quantum dot is fluorescent, radio-opaque, and paramagnetic.

Claim 53 (New): The composition of claim 52, further comprising a pharmaceutically active agent.